



TITLE:

Upper atmospheric researches using metadata database and data analysis software developed by the IUGONET project

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IUGONET

Metadata DB for Upper Atmosphere

JpGU@Makuhari, Chiba
MTI coupling in Asian sector

PEM08-30

2012/05/22

超高層大気長期変動の全地球ネットワーク観測・研究
Inter-university Upper atmospheric Global Observation NETwork

Upper atmospheric researches using
metadata database and data analysis
software developed by the IUGONET project

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¹RISH, Kyoto Univ.

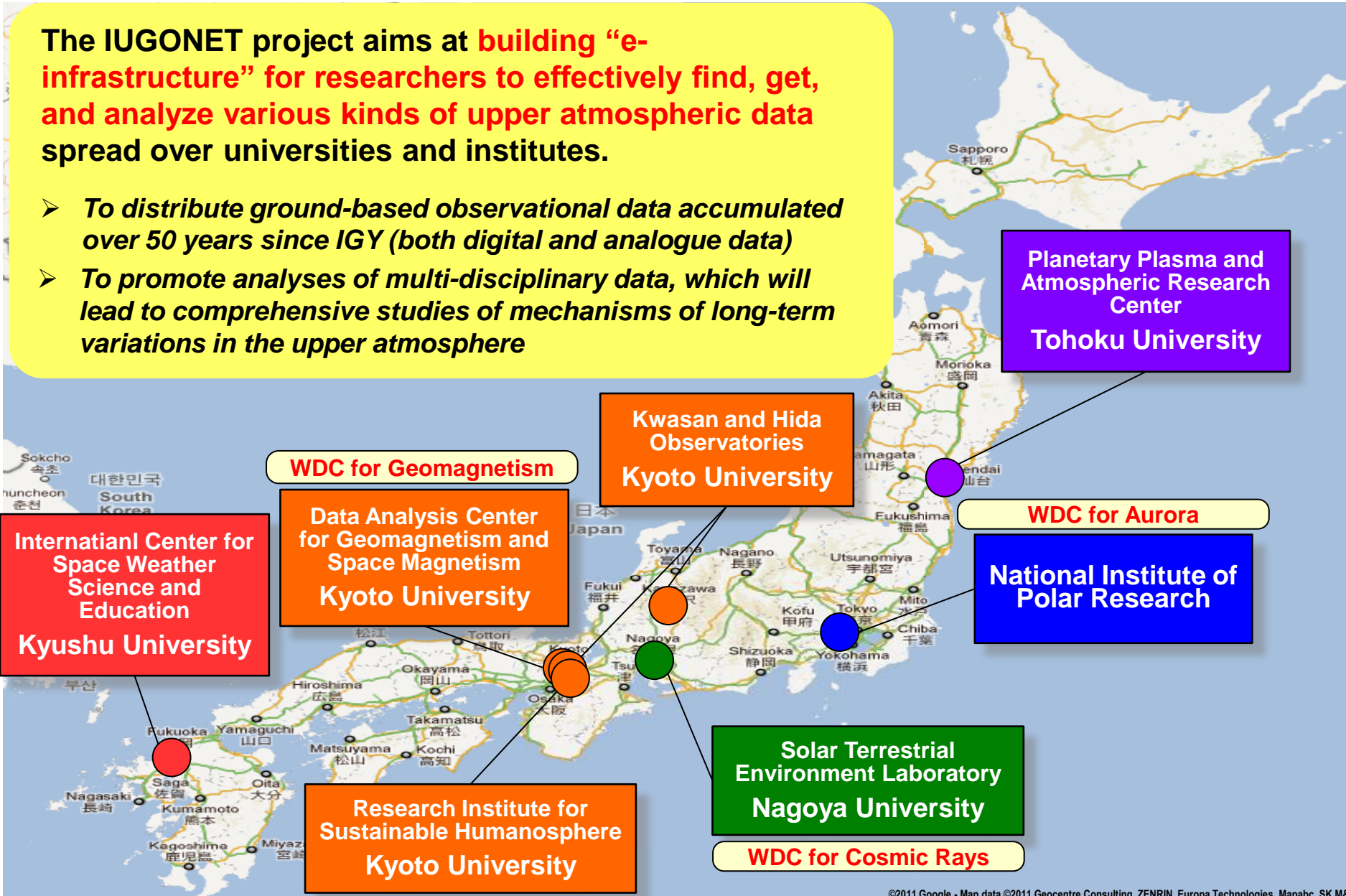
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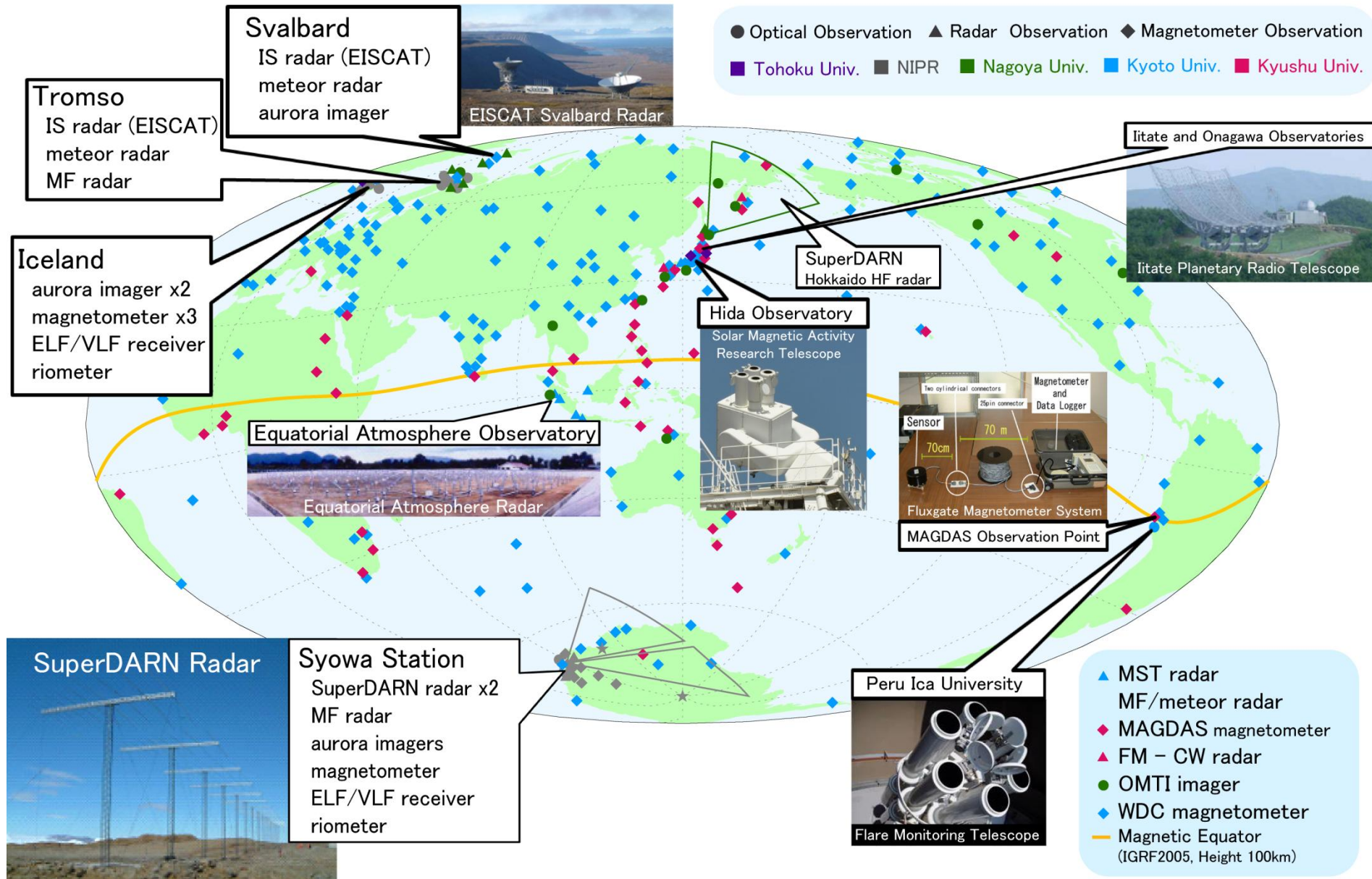
1. Introduction (Objective of the IUGONET project)

The IUGONET project aims at **building “e-infrastructure”** for researchers to effectively find, get, and analyze various kinds of upper atmospheric data spread over universities and institutes.

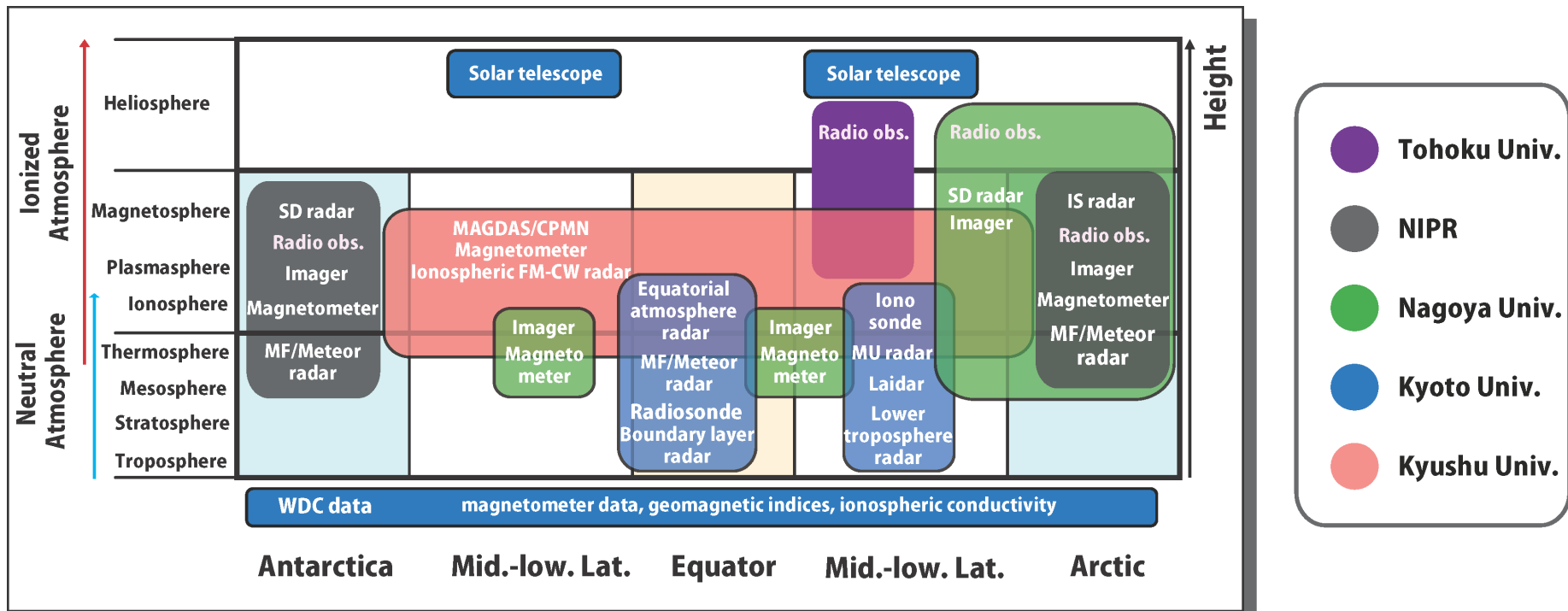
- *To distribute ground-based observational data accumulated over 50 years since IGY (both digital and analogue data)*
- *To promote analyses of multi-disciplinary data, which will lead to comprehensive studies of mechanisms of long-term variations in the upper atmosphere*



1. Introduction (IUGONET observation networks)



1. Introduction (Problems of data use)



Various observation parameters (wind, geomagnetic field, aurora, sunspot etc.) taken by various techniques in various time periods at various locations and altitudes

Such observational data not necessarily well used in scientific researches so far

→ **PROBLEMS:** databases dispersed, too little info, various data format, etc.

SOLUTIONS

1. Metadata database : to share info of data online and realize cross-search
2. Data analysis software : to help users quickly visualize and analyze data



2. Main products by the IUGONET project

1. Metadata database

<http://search.iugonet.org/iugonet>

Result of Search

[Standard observation data of the ionosphere taken by the MU radar \(PNG format\)](#)

Go to metadata details →

<http://www.rish.kyoto-u.ac.jp/radar-group/mu/isdata>

Jump to database web →

[BLR-1 at Shigaraki \(GIF format\)](#)

DisplayData

The time-height plots of the three components of wind velocity (zonal, meridional and vertical winds), the echo power and spectral width of three radar beams in the lower troposphere between 0.5 and 6.5 km taken by the boundary layer radar (BLR)-1 at Shigaraki in the prefecture, Japan (34.86N, 136.11E, 385m MSL). The plots are stored in the gif file named (year)(month)(day).(variable).gif for one month plot or (year)(month)(day).(variable).gif for one day plot. The variable abbreviations are wnd, pwr and wdt, which mean wind velocity, echo power and spectral width, respectively. Local time is used for time. The right panels of each time-height plot are 1-day or 1-month average profiles of each parameter as a function of height. The missing data are presented by white color.

Start Date: 1992-04-12T15:00:00
Stop Date: 1992-08-29T14:59:59
<http://www.rish.kyoto-u.ac.jp/radar-group/blr/shigaraki/data/index.html>
Repository: [spase://IUGONET/Repository/RISH/RISHDB](#)

2. Data analysis software

<http://www.iugonet.org/en/software.html>

IUGONET Inter-university Upper atmosphere
Global Observation NETWORK

Analysis Soft. Metadata DB Project

UDAS (IUGONET Data Analysis Software)

Topics

- UDAS v2.00.1 was released.
(Apr 19, 2012)

What is UDAS?

The IUGONET Data Analysis Software (UDAS) is the plug-in software for **THEMIS Data Analysis Software suite (TDAS)**.

- The IUGONET data (e.g., geomagnetic data, aurora data, radar data, and so forth), satellite data (THEMIS, GOES, WIND, and ACE) can be handled.
- It is possible to use many routines to visualize and analyze time series data.
- It accesses the IUGONET data through the Internet, and then the data are automatically downloaded onto the user's computer.

Screenshots

List of load procedures for UDAS

Descriptions of the TPLLOT variables (.xls)

Data Policy

When you use the IUGONET data, please check the data policy for each data set. The data policy will be displayed in the console, when you run the load procedures on IDL. It is also possible to search the data policy at [the IUGONET Metadata](#)

DOWNLOAD UDAS

UDAS
↓
TDAS
↓
IDL

We have already released the IUGONET metadata database and the integrated **data analysis software!**



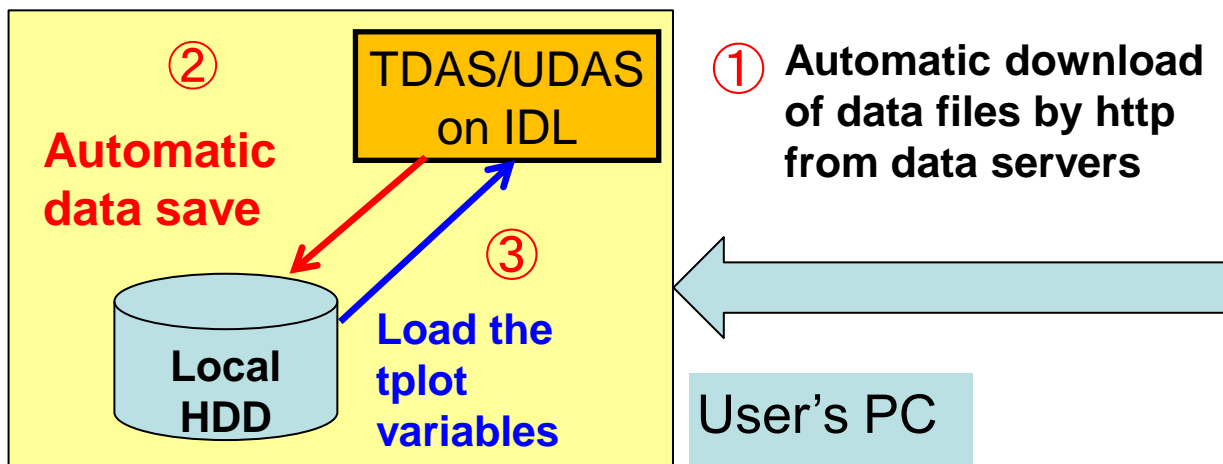
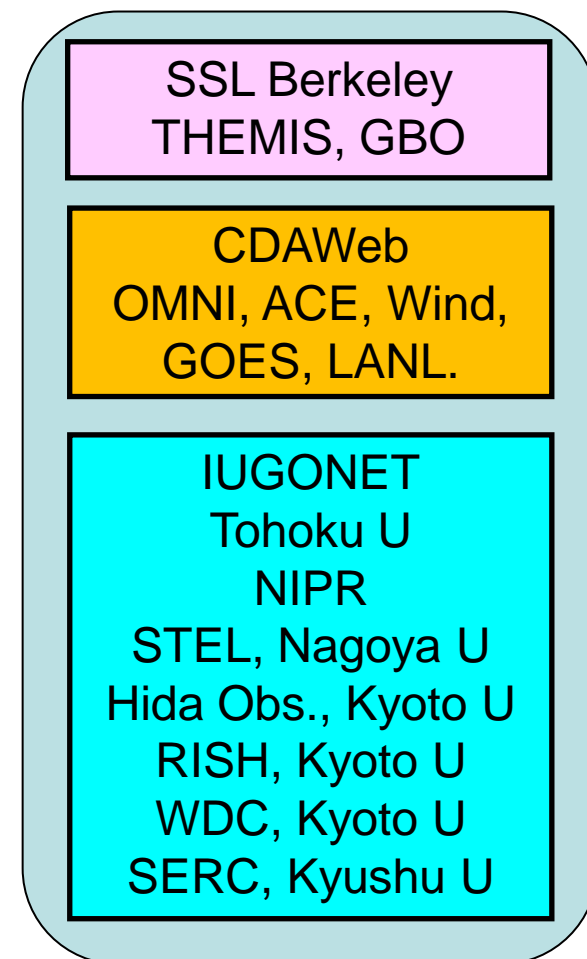
3. Development of analysis software

3.1 Characteristics of the UDAS software

UDAS is a plug-in software of **TDAS** and includes the load procedures for observation data distributed by the **IUGONET** institutions.

```
> timespan, 'yyyy-mm-dd', 13, /day
> thm_load_○○○
> tplot, △△△
```

Data server



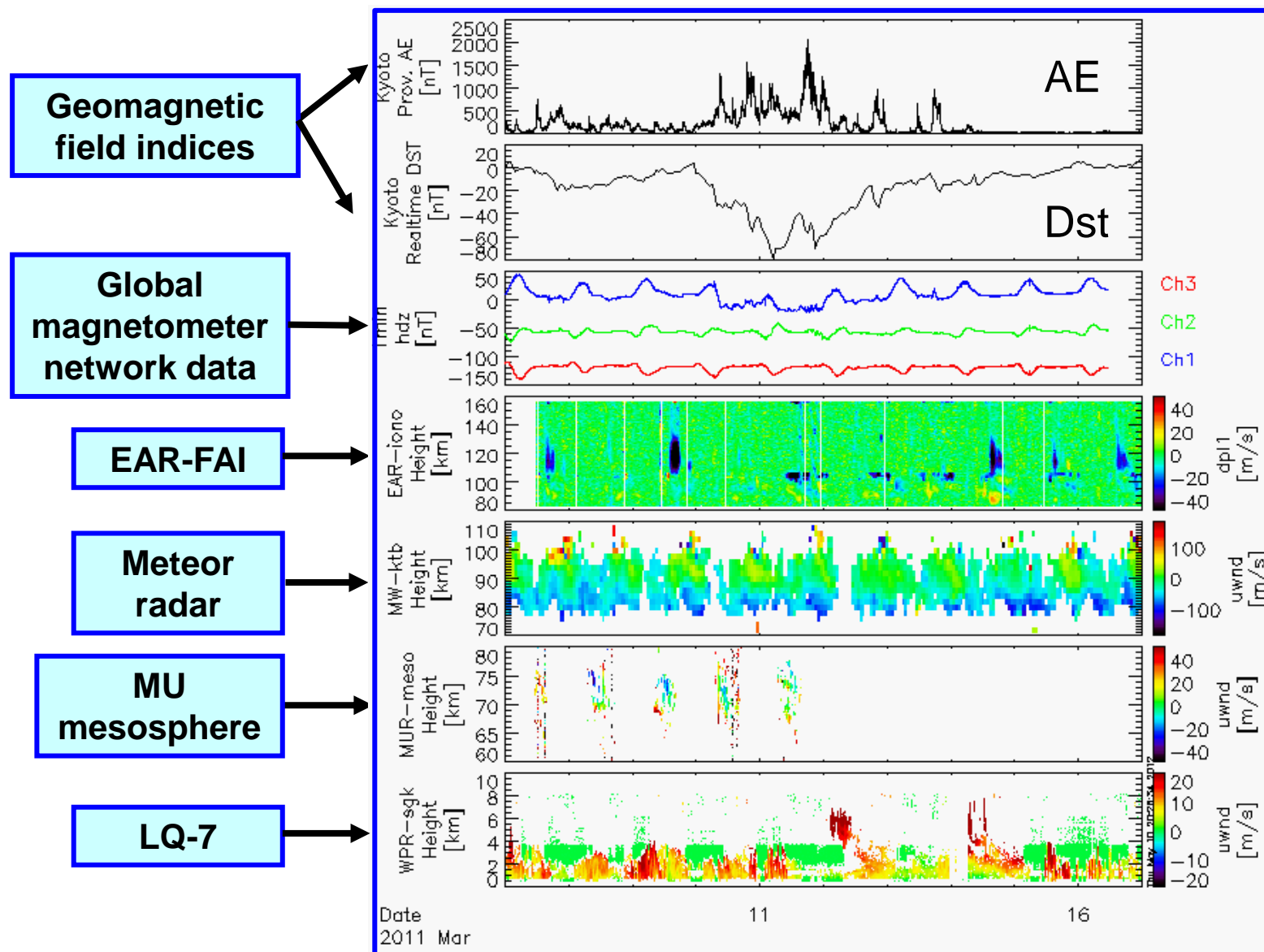
Users can get and analyze various kinds of observation data without any concerns about data locations and formats.



3. Development of analysis software

3.2 Sample plot using the UDAS software

2011/3/7-16



4. Database of MF/MW radars in Indonesia

4.1 Webpage of MF/MW radar data in Indonesia

Meteor Wind and Medium Frequency Radar Data over Indonesia

What's New :

- [Kototabang MWR] Time-height plot (Version 1.1.2) were uploaded. (Mar 05, 2012)
- [Serpong MWR] Time-height plot (Version 1.1.2) were uploaded. (Mar 05, 2012)
- [Kototabang MWR] New NetCDF Data (Version 1.1.2) were released. (Feb 13, 2012)
- [Serpong MWR] New NetCDF Data (Version 1.0.2) were released. (Feb 13, 2012)

Data Use Policy

If you would like to use following data for scientific purpose, please read and follow the DATA USE POLICY ([English](#), [Japanese](#))

Radar Site:

Kototabang MWR (0.204S, 100.320E)
Pontianak MF (0.003S, 109.367E)
Biak MWR (1.175S, 136.102E)
Serpong MWR (6.361S, 106.658E)
Pameunpeuk MF (7.646S, 107.688E)

Please click the observation station over the map!

Access URL:

<http://database.rish.kyoto-u.ac.jp/arch/iugonet/index-idr.html>

Information of the latest data

Jump to the detailed data use policy
(English, Japanese).

Please read it carefully before you use the radar data.

If you click the observation station shown on the map, you can go to the download page of observation data at the selected station.

4. Database of MF/MW radars in Indonesia

4.2 Category of MF and MW radar data in Indonesia

Serpong MW radar

- **Numerical data** (1992/10-1999/08)
Wind data (1-day, 1-month files)
Text, NetCDF
Resolution :
2 km, 60 min (-30-30 min)
4 km, 240 min (-120-120 min)
- **Display data**
GIF (1-day, 1-month, 1-year)

Kototabang MW radar

- **Numerical data** (2002/11-present)
Original: Text (1-day file)
Wind data (1-day, 1-month files)
Text, NetCDF
Resolution :
2 km, 60 min (-30-30, 0-60 min)
4 km, 60 min (-30-30, 0-60 min)
- **Display data**
GIF (1-day, 1-month, 1-year)

Pameungpeuk MF radar

- **Numerical data** (2004/03-present)
Binary (1-day file)
NetCDF (1-day file)

Pontianak MF radar

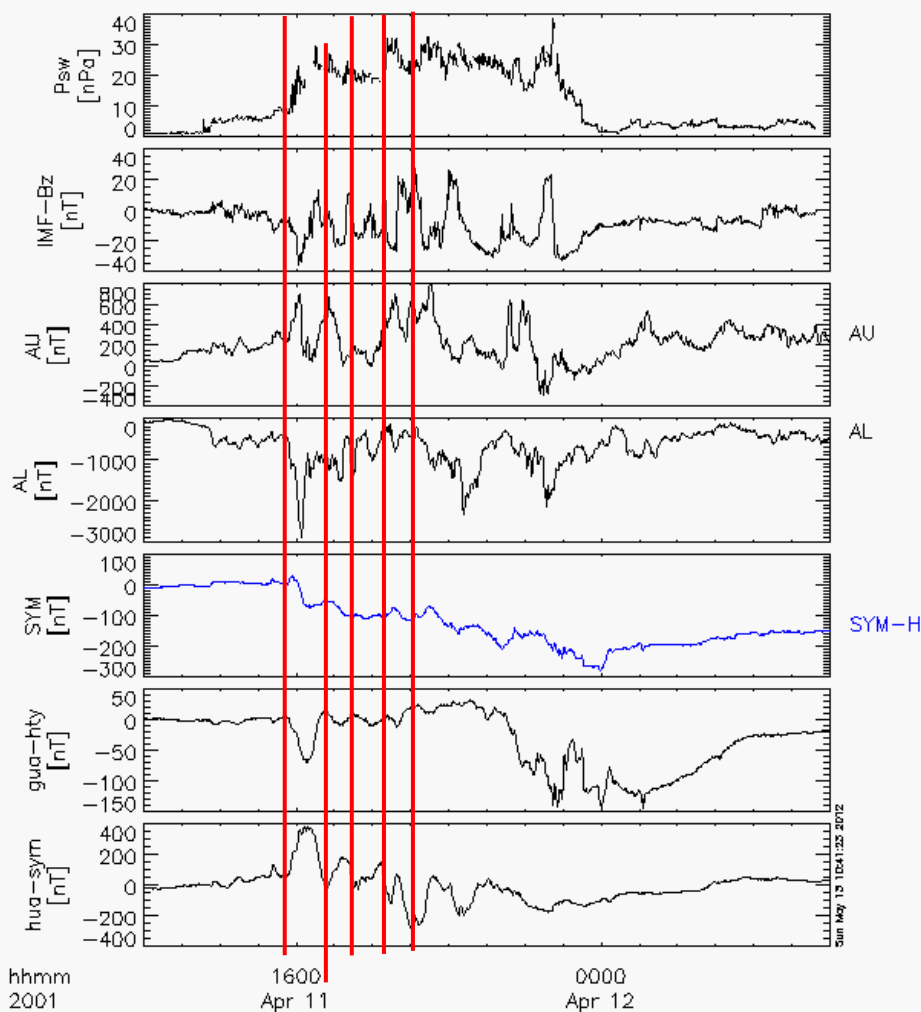
- **Display data** (2010/02-2011/05)
PNG (1-day and 1-month files)



5. Example of upper atmospheric researches

- Global geomagnetic field variation and ionospheric disturbance dynamo during geomagnetic storms.

Leader: Dr. Hayashi (Kyoto Univ.) Joint research program of NIPR



[Purpose of this study]

To clarify the origin of global magnetic field variations during geomagnetic storms using solar wind and magnetic field observations.

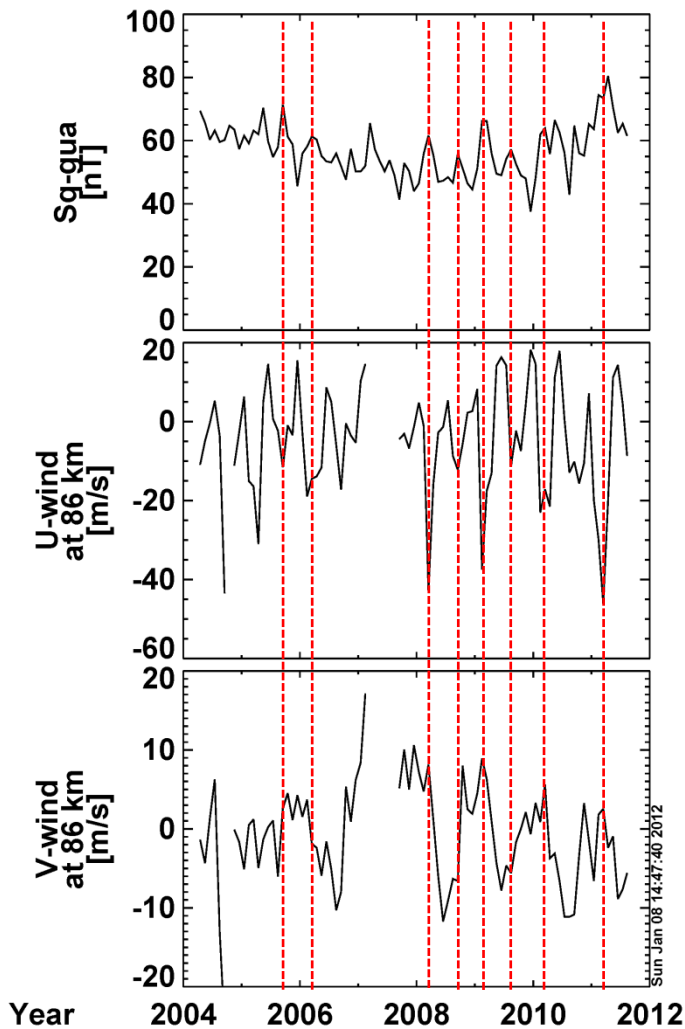
In this case, eastward and westward equatorial electrojets are enhanced on the dayside and nightside, respectively, at the onset of geomagnetic storm.



5. Example of upper atmospheric researches

- Long-term variation of upper atmosphere as seen in the amplitude of solar quiet (Sq) daily variation.

Leader: Dr. Shinbori (Kyoto Univ.) Joint research program of STEL



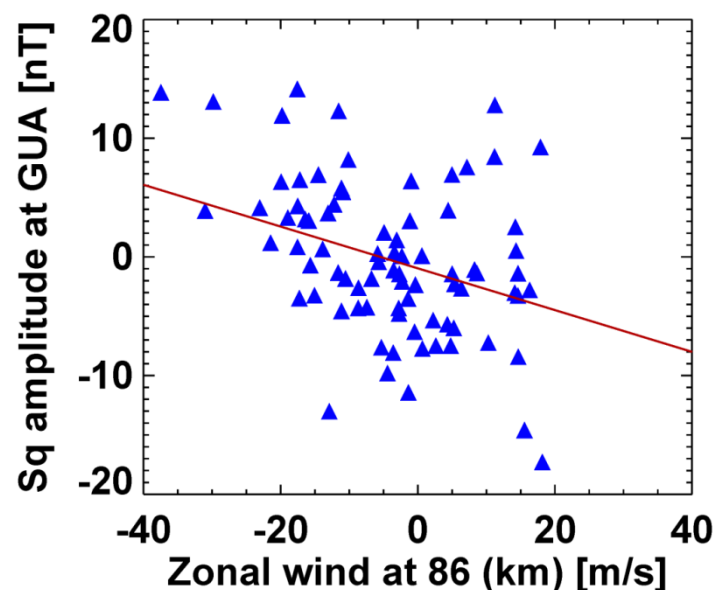
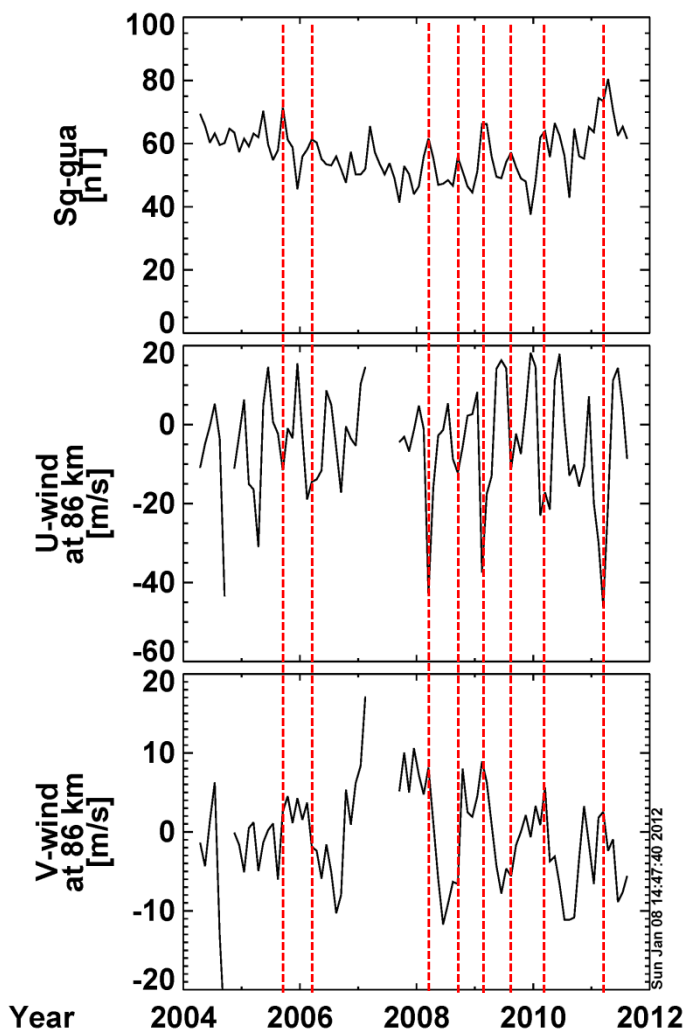
[Purpose of this study]

To clarify the origin of long-term variation of Sq amplitude from correlation analysis between geomagnetic field and wind in the MLT region.

5. Example of upper atmospheric researches

- Long-term variation of upper atmosphere as seen in the amplitude of solar quiet (Sq) daily variation.

Leader: Dr. Shinbori (Kyoto Univ.) Joint research program of STEL



The Sq amplitude tends to enhance when zonal wind is directed westward.

This result suggests that the MLT wind contributes to ionospheric dynamo which produces ground magnetic field variations.



6. Summary

- **The IUGONET project** (<http://www.iugonet.org>) builds metadata database and **data analysis software (UDAS)** to promote effective use of upper atmospheric data taken by various ground-based observations.
- **UDAS** is a plug-in software of **TDAS** and provides the load procedures for the various ground-based observational data distributed by each institution in the IUGONET project.
- We **promote long-term variation of upper atmosphere using various kinds of observation data** in order to evaluate a capability of our developed products.
- The IUGONET products have been released!

Metadata database : <http://search.iugonet.org/iugonet/>

Analysis software : <http://www.iugonet.org/en/software.html>

We welcome your feedback